

**Abstract for the 1995 Fall Meeting**

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Fundamentals and applications**

**EXCIMER-LASER SURFACE HEAT TREATMENT OF InSe AND  
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The preparation of amorphous thin films of semiconductors and their transition to the crystalline phase is of particular interest because of potential applications to semiconductor technology and switching devices.

The surfaces of single crystal samples of bulk In<sub>2</sub>Se<sub>3</sub> and thin films of InSe were treated using an excimer laser operating at 248 nm (KrF). The samples of bulk In<sub>2</sub>Se<sub>3</sub> were cleaved and the exposed faces mounted in a vacuum chamber. The surfaces were treated with one to ten pulses (10 nsec) of laser radiation, with energy densities of 40 - 100 mJ/cm<sup>2</sup>. Characterization using x-ray diffraction (XRD), High Resolution Electron Microscopy (HREM) and Scanning Electron Microscopy (SEM) showed the treated portions of surface to have become amorphous. Annealing these samples at 190°C following the laser treatment resulted in crystallite of 14 to 70 nm in diameter forming at the surface.

Thin film samples of InSe, made by direct evaporation of In<sub>2</sub>Se<sub>3</sub> onto quartz substrates using an electron beam, were laser treated in a manner similar to the treatment of the bulk samples. Treated films were characterized using XRD, SEM, (HREM) and by measuring the change in optical transmittance in the range 300-2500 nm. Preliminary analysis of the treated films show shifts in the optical transmittance spectra as well as surface morphology changes. Comparison of XRD of treated and untreated areas showed no change in the crystal structure. Characterization of the treated film and bulk samples will be presented along with a correlation of energy density of the treatment beam with altered characteristics.